

lative action. Further investigations on this point are now being carried out by Professor Carnelley at Dundee.

At the time when the results of our analysis led us to this important result, we were unaware of the very interesting research made recently by Dr. Emmerich of Leipzig; I think the results he obtained may throw a great deal of light on this cumulative infection of the air by micro-organisms. At any rate his research was such an important one, that I need not apologize for shortly referring to it.

He made a large number of analyses of the damping material used for filling up the space between the ceiling of one flat and the floor of the flat above. He found an almost incredible pollution of this material. His analyses show that, to use his own words, "there exists nowhere in nature, not even in the neighborhood of human dwellings, a soil so highly contaminated with nitrogenuous organic substances and their decomposition products as the damping material under the floor of dwelling rooms." The amount of chloride of sodium found in this material was on an average seven times greater than that found in the ground under leaky cesspools, and twelve times greater than that in the soil round a dung hill, although this soil was visibly soaked with filth. When the coarse pieces of stone were separated from this material, it was found that the finer dust and sand which was left, contained even more nitrogenuous matter than human excrement. "In the damping material of a single room, there was usually more excremental matter present than in a large cesspool." That all this filth is alive with micro-organisms, is shown by the amount of the products of decomposition which result from their activity. Thus under the floor of one single room Emmerich found that there were more than 6 cwt. of nitric acid in the form of nitrates. He also showed that the carbonic acid in the air of rooms left shut up and empty increased, although all other known sources of carbonic acid, such as sub-soil, air, &c., were excluded. The chief cause of this contamination was undoubtedly the soaking of fluids and shaking of dust through the fissures and spaces between the boards in the floor. Often, however, the rubbish which was used as damping material was contaminated from the beginning, having been taken from old houses, or rubbish heaps, such apparently as many houses in this country are built upon.

Emmerich's paper is such a remarkable one, and contains so many points of interest, that one is surprised at not having heard something of it in this country. It is well worth the careful attention of everyone interested in questions of public health. There seems no reason to doubt that a very similar state of pollution exists in the damping material of English houses.

Emmerich followed up this research by another no less interesting one in connection with the same subject. In a prison at Amberg there had persistently occurred for years epidemics of croupous pneumonia. The last of these had attacked every seventh, and killed every twentieth prisoner. As is well-known, the late Dr. Friedländer, of Berlin, discovered the presence in cases of croupous pneumonia of a species of bacterium, cultivations of which, when inhaled by, or inoculated into, certain animals, produces a similar disease in them. There can thus be little doubt as to the casual connection between this organism and the disease, or at any rate certain forms of it. Emmerich examined the damping material from the infected rooms in the Amberg prison. He not only found this material full of organic matter as usual, but actually discovered Friedländer's bacterium in enormous numbers.

To return to our own researches, it seems very likely that the progressive contamination of the material in the floors, and perhaps elsewhere about the room, may be connected with the progressive contamination of the air with micro-organisms. Emmerich's researches throw a vivid light on the manner in which this progressive contamination may affect the health of the inhabitants. A glance at our table of statistics will show how the mortality from croupous pneumonia, for instance, increases from 3.5 per thousand in the better houses to 6.6 in the three-roomed, and 12.5 in the one and two-roomed. Probably the mortality would be even larger in the latter class were it not for the influence of hospital treatment, which is very frequently taken advantage of in cases of croupous pneumonia, and is of great benefit.

In what manner exactly mechanical ventilation reduces the number of micro-organisms in the air seems still rather obscure. The explanation may perhaps lie in the more efficient sweeping out with the air of the particles of suspended organic matter which would otherwise have formed a pabulum for